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Date: January 6, 2009

Patent 0-05-109 - 15408/US/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Bar-Yaakov et al.
Serial no.: 10/541,668
371(c) date: December 27, 2005
I.A. Filed: January 12, 2004
Title: FLAME RETARDANT FOR ENGINEERING
THERMOPLASTIC APPLICATIONS
Examiner: Megan MCCULLEY
Art Unit: 1796
Confirmation: 4122

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Response and Amendment

This response is being submitted in reply to the office action mailed on October 15, 2008.

Amendments

Please amend the claims as shown on the attached marked-up pages. Claims 1, 10, and 22 have been restricted to the molecular weight as defined in original claim 5. The subject matter of claim 23 has been incorporated into amended claim 22. Claims 5 and 23 have been canceled. A formal correction has been effected in claims 1, 10, and 22, replacing the term "composition" with the term "retardant" making the wording clearer (supported on pages 2-3).

Claim Rejections – 35 USC §102

The Examiner rejects claims 1-10 and 21-22 as being anticipated by US 5,837,799 (Chen et al.). The Applicant respectfully traverses the Examiner's objection.

Amended claims 1, 10 and 22 now specifically disclose flame retardants having a molecular weight of between 7,000 and 50,000 Daltons (supported on page 4, line 1). Amended claim 22 now also incorporates the features of claim 23.

The Applicant respectfully draws the Examiner's attention to the fact that Reference Example 4 of Chen, mentioned by the Examiner as an example of fully end-capped brominated epoxy resin, is not a working example of the Chen's invention but a

reference sample, which refers to a commercially available product from Tohto Kasei, namely TB-62 (see col.6, line 38). As shown in the enclosed TB-62 datasheet, this fire retardant, whereas almost fully end-capped, has a molecular weight of only 1,800-2,300 Daltons. Therefore, reference made to TB-62 would only show that it is possible to make low molecular weight tribromophenol (TBP) fully end-capped brominated epoxy resins.

On the other hand, it would be clear for an average person skilled in the art that Chen teaches only partially TBP end capped brominated epoxy resins, with a capping percent of at most 65% (see abstract).

Therefore, the Applicant respectfully submits that neither Chen nor TB-62, are indeed flame retardants having both:

- at least 80% of the end groups being tribromophenyl-oxo-2-hydroxypropyl groups (in other words, at least 80% end-capping);

AND

- a molecular weight of between 7,000 and 50,000 Daltons.

Concerning the method of the present invention, the Applicant respectfully draws the Examiner's attention to the fact that, before the present invention, literature describing the manufacture of high molecular weight almost fully TBP-end capped brominated epoxy resins, always mentioned the use of a solvent. This is because the reaction mixture of the prior art must be stirred in order to complete the reaction. If no solvent is used, as the reaction proceeds, the mixture becomes more and more viscous and therefore it is impossible to stir the mixture until the end of the reaction. This would cause a problem as it would be impossible to control the temperature of the exothermic reaction (especially at the center of the reactor which is far from the reactor walls) and would have caused severe thermal degradation of the reaction mixture. Moreover, it would be impossible to remove the final product from the reactor and to handle it. Therefore, whenever someone wants to produce high molecular weight almost fully TBP end-capped brominated epoxy resins, they would use solvent.

In the present invention, the Inventors avoid the use of a solvent by melting the different components at a temperature in the range from 100 to 250°C, so being able to produce high molecular weight, heavily TBP end-capped brominated, epoxy resins without using solvent.

The Applicant believes that claims 1, 10, 22, and all the claims dependent therefrom, are novel and non-obvious in view of Chen et al and the product of Tohto Kasei.

Claim Rejections under 35 USC §103

The Examiner rejects claims 20 as being unpatentable over US 5,837,799 (Chen et al.), in view of US 2001/0009944 (Chisholm et al.) or JP 2001-310990 (Nantaku et al.). The Applicant respectfully traverses the Examiner's objection.

As it is believed that amended claim 10 is novel and non-obvious over the prior art, then claim 20, which is dependent from claim 10, is also novel and non-obvious.

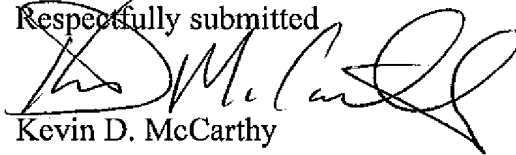
The Examiner rejects claim 23 as being unpatentable over US 5,837,799 (Chen et al.), in view of JP 2001-310990 (Nantaku et al.).

Claim 23 has been cancelled therefore rendering the Examiner's objection moot. The subject matter of original claim 23, when combined with the subject matter of original claim 22, as in amended claim 22, is now believed to be non-obvious.

Conclusion

Following the above explanations and the effected amendments, it is the Applicant's belief that the invention, as described in the amended claims, is novel and non-obvious over all the cited documents, and that the amended claims are ready for allowance.

Respectfully submitted

A handwritten signature in black ink, appearing to read "Kevin D. McCarthy", written over the typed name.

Kevin D. McCarthy

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